Meridian 1

Intelligent peripheral equipment circuit cards for Denmark

Option 11 - Description and Installation

Document Number: Supplement to 553-3011-210
Document Release: Provisional 2.0
Date: April 1994

© 1992, 1994
All rights reserved

Printed in Canada

Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant. This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules.

SL-1 and Meridian 1 are trademarks of Northern Telecom.

Revision history

April 1992

Provisional, release 2.0

October 1992

Provisional, release 1.0

Contents

About this document vii

Central office trunk circuit card 1

Functional description 1

Physical description 2

Technical description 4

Trunk types description 6

Features description 7

E&M Tie trunk circuit card 9

Functional description 9

Physical description 10

Technical description 15

Trunk types description 16

Flexible analog line circuit card 25

Functional description 25

Physical description 26

Technical description 26

Tone detector circuit card 29

Functional description 29

Physical description 30

Technical description 30

Country specific tone detection 31

Terminal Information 33

M2250/M2616 General Information 33

About this document

This document is a Supplement to the Option 11 *Installation guide* (553-3011-210). It describes the functions and applications of the following circuit cards that are available for use in Denmark: These cards are the minimum vintage required to support release 8B.

- NT5K90AB Central Office Trunk card with PPM
- NT5K90BB Central Office Trunk card Without PPM
- NT5K83BB E&M Tie Trunk card
- NT5K02JB Flexible Analog Line card with message waiting
- NT5K96JB Flexible Analog Line card without message waiting
- NT5K48 Tone Detector
- NT6G42AB-35 M2250 console

Central office trunk circuit card

Functional description

The NT5K90 trunk card provides the interface between the Option 11 system and up to eight analog Central Office (CO) trunks. It can be installed in slots 1-10 in the main cabinet and in any slot in the expansion cabinet.

There are two types of Central office trunk circuit Cards for use in Denmark:

- the NT5K90AB Central Office Trunk card with PPM.
- the NT5K90BB Central Office Trunk card without PPM.

Common features

The NT5K90 Central office trunk card:

- is equipped with eight trunk units
- has a Centrex Flashook (90 mS)
- allows trunk type to be configured on a per unit basis
- provides software selectable A-law or μ-law companding
- indicates self-test status during an automatic or manual self-test
- provides card-identification for auto configuration, and for determining the serial number and firmware level of the card
- converts transmission signals from analog-to-digital and from digital-to-analog

- provides adjustable balance impedance, configured in software
- provides adjustable transmission pads for long/short line operation
- provides direct reporting of Periodic Pulse Metering (PPM) pulses to software in either buffered or unbuffered format.

Physical description

Switch settings

There are no option switches on the NT5K90 Central office trunk card. All settings are configured in software.

Connections

The NT5K90 Central office trunk card has eight units. Each unit connects to the shelf backplane through an 80-pin connector. The backplane is cabled to the input/output (I/O) panel which is then cabled to the cross-connect terminal.

Tables 1 to 3 show cross connect terminations for the NT5K90 Central office trunk card.

Table 1
NT5K90 Central Office Trunk connections

Lead	Pins	Pair color	Unit number
T0 R0	26 1	W-BL BL-W	Unit
	27 2	W-O O-W	0
T1 R1	28 3	W-G G-W	Unit
	29 4	W-BR BR-W	1
T2 R2	30 5	W-S S-W	Unit
	31 6	R-BL BL-R	2
T3 R3	32 7	R-O O-R	Unit
	33 8	R-G G-R	3
T4 R4	34 9	R-BR BR-R	Unit
	35 10	R-S S-R	4
T5 R5	36 11	BK-BL BL-BK	Unit
	37 12	BK-O O-BK	5
T6 R6	38 13	BK-G G-BK	Unit
	39 14	BK-BR BR-BK	6
T7 R7	40 15	BK-S S-BK	Unit
	41 16	Y-BL BL-Y	7

Self-test

When the NT5K90 trunk card is installed and power is applied to it, a self-test is performed on the card. The red LED on the NT5K90 faceplate flashes three times, then remains continuously lit until the card is enabled in software. If the self-test fails, the LED will remain lit after the card is enabled.

Technical description

Power requirements

Table 2 lists the power requirements for the NT5K90 Central office trunk card.

Table 2
NT5K90 circuit card power requirements

Voltage	Idle current	Active current
+/- 15.0 V dc (see note 1)	150 ma	300 ma
+ 8.5 V dc (see note 2)	80 ma	80 ma
- 48.0 V dc	50 ma	50 ma
+ 5.0 V dc	200 ma	500 ma

Note 1: Analog circuitry is powered with +/- 12V generated from +/- 15V. The maximum current imbalance between the +/- 15 V rails is 100 ma per circuit pack.

Note 2: 8.5 V is regulated to provide 5V.

Environmental specifications

Table 3 lists the environmental specifications of the NT5K90 Central office trunk card.

Table 3
NT5K90 circuit card environmental specifications

Parameter	Specifications
Operating temperature	0 to 45 degrees C, ambient
Operating humidity	5 to 95 % Relative Humidity
Storage temperature	- 40 to + 70 degrees C

Transmission parameters

Loss Plan

The NT5K90AB/BB central office trunk cards will meet the requirements of ETSI loss plan for both the digital and analog interface using Static Loss Plan Table 13 in overlay 97. These cards will also meet the requirements of the 'Existing' plan which is referred to as 'Old Loss Plan' using Table 14 in overlay 97 .

Loss values for the NT5K90 central office trunk card are given in Table 4.

Table 4
Loss values for NT5K90 central office trunk card

	ETSI		Existing	
	Short l	**Long l**	**Short l**	**Long l**
Loss A/D	-3	-5	4	0
Loss D/A	3	1	1	-3

Note: For ETSI Mode , Table 5 in overlay 97 is used .For Existing Mode , Table 6 in overlay 97 is used .

Trunk types description

Each NT5K90 Central office trunk card supports:

- Loop start operation
- Supervised loop start signaling using CO polarity reversals (ARF signaling)
- Direct Inward System Access (DISA), but only when configured in the supervised loop start signaling mode.
- 12 kHz Periodic Pulse Metering (PPM), also referred to as Subscriber Pulse Metering (SPM).

Note: The NT5K90AB circuit card supports PPM, but the NT5K90BB circuit card does not.

Loop start operation

Loop start operation is configured in software and is implemented in the card through software download messages.

Idle state

In the idle state, the central office trunk card provides a high impedance (greater than 3MΩ) toward the central office for isolation and dc detection.

Call placed by central office

The central office initiates a call by applying ringing between the tip and ring leads. If the call is answered, the meridian 1 ringing detector is switched out and the Central Office trunk card places a low resistance DC loop between the tip and Ring leads.

Call placed by Option 11

To initiate a call, the Option 11 switches out the ringing detector and places a low resistance loop across the tip and ring leads. When the Central Office is ready to receive digits, it responds by providing battery reversal. The reversal is detected by the Central Office trunk and reported to software. The Central Office will also provide dial tone. The Option 11 sends digits in the form of dual tone multifrequency (DTMF) digits or dial pulses

Central office disconnects first

The Central Office disconnects a call by providing a battery reversal at the tip and ring leads. The central office trunk detects the battery reversal and reports it to the Option 11 software. The Option 11 responds by returning the trunk to the idle state.

Option 11 disconnects first

The Option 11 disconnects a call by returning the Central Office to the idle state (the DC loop is removed and is replaced by the high impedance state at tip and ring).

Features description

Periodic Pulse Metering (PPM)

All trunk units on the NT5K90AB card support the Periodic Pulse Metering (PPM) feature, or Subscriber Pulse Metering (SPM), as it is sometimes called.

> ***Note:*** The NT5K90BB circuit card is identical to the NT5K90AB circuit card with the exception of PPM and busy tone detection. The NT8K90BA circuit card does not support either feature.

Periodic Pulse Metering allows the user of a telephone on a Option 11 to keep an accurate record of central office and Direct Outward Dialing (DOD) calls for billing or administration purposes.

> ***Note:*** PPM can be configured either on a per card basis or on a per unit basis, depending on the release of Option 11 software.

E&M Tie trunk circuit card

Functional description

The NT5K83BB E&M Tie trunk card provides the interface between the Option 11 system and up to four analog trunks. It can be installed in slots 1-10 in the main cabinet and in any slot in the expansion cabinet.

The NT5K83BB E&M Tie trunk card supports four analog trunks. Each trunk circuit can be individually configured as:

- 4-wire E&M Type 5 and 2
- Recorded Announcement trunk (RAN)
- Music trunk (MUS)
- Paging trunk (PAG)

Common features

The NT5K83BB E&M Tie trunk card:

- is equipped with four trunk units
- converts transmission signals from analog-to-digital and from digital-to-analog
- enables and disables individual units or the entire card under software control
- provides outpulsing on the card. Make break ratios are defined in software and down loaded during power up and by software commands.

- provides indication of card status from self-test diagnostics on the LED
- allows trunk type to be configured on a per unit basis in software
- provides termination against 600 ohms for 4-wire E&M trunk circuits
- provides paging (PAG), recorded announcement (RAN), and Music interfaces.

Physical description

Switch settings

There are no option switches on the NT5K83BB E&M Tie trunk card. All settings are configured in software.

Connections

The NT5K83BB E&M Tie trunk card has four units. Each unit connects to the shelf backplane through an 80-pin connector. The backplane is cabled to the input/output (I/O) panel which is then cabled to the cross-connect terminal.

Tables 1 to 4 show cross connect terminations for the NT5K83 E&M trunk card.

Table 5
NT5K83 E&M 2-Wire Paging trunk connections

Lead designations	Pins	Pair color	Unit number
T0 R0	27 2	W-O O-W	Unit
A PG	29 4	W-BR BR-W	0
T1 R1	31 6	R-BL BL-R	Unit
A PG	33 8	R-G G-R	1
T2 R2	35 10	R-S S-R	Unit
A PG	37 12	BK-O O-BK	2
T3 R3	39 14	BK-BR BR-BK	Unit
A PG	41 16	Y-BL BL-Y	3

Table 6
NT5K83 E&M 2-wire Recorded Announcement trunk connections

Lead designations	Pins	Pair color	Unit number
T0 R0	26 1	W-BL BL-W	Unit
SIG B SIG A	29 4	W-BR BR-W	0
T1 R1	30 5	W-S S-W	Unit
SIG B SIG A	33 8	R-G G-R	1
T2 R2	34 9	R-BR BR-R	Unit
SIG B SIG A	37 12	BK-O O-BK	2
T3 R3	38 13	BK-G G-BK	Unit
SIG B SIG A	41 16	Y-BL BL-Y	3

Table 7
NT5K83 E&M 4-Wire Type 5 connections

Lead designations	Pins	Pair color	Unit number
TA TB	26 1	W-BL BL-W	
RA RB	27 2	W-O O-W	Unit 0
E M	28 3	W-G G-W	
TA TB	30 5	W-S S-W	
RA RB	31 6	R-BL BL-R	Unit 1
E M	32 7	R-O O-R	
TA TB	34 9	R-BR BR-R	
RA RB	35 10	R-S S-R	Unit 2
E M	36 11	BK-BL BL-BK	
TA TB	38 13	BK-G G-BK	
RA RB	39 14	BK-BR BR-BK	Unit 3
E M	40 15	BK-S S-BK	

Table 8
NT5K83 E&M 4-Wire Type 2 trunk connections

Lead designations	Pins	Pair color	Unit number
RA RB	26 1	W-BL BL-W	
TA TB	27 2	W-O O-W	Unit 0
E1/E2 M!/M2	28 / 3 29 / 4	W-G / G-W W-BR / BR-W	
RA RB	30 5	W-S S-W	
TA TB	31 6	R-BL BL-R	Unit 1
E1/E2 M!/M2	32 / 7 33 / 8	R-O / O-R R-G / G-R	
RA RB	34 9	R-BR BR-R	
TA TB	35 10	R-S S-R	Unit 2
E1/E2 M!/M2	36 / 11 37 / 12	BK-BL / BL-BK BK-O / O-BK	
RA RB	38 13	BK-G G-BK	
TA TB	39 14	BK-BR BR-BK	Unit 3
E1/E2 M!/M2	40 / 15 41 / 16	BK-S / S-BK Y-BL / BL-Y	

Self-test

When the NT5K83 E&M Tie trunk card is installed and power is applied to it, a self-test is performed on the card. The red LED on the faceplate flashes three times, then remains continuously lit until the card is enabled in software. If the self-test fails, the LED will remain lit after the card is enabled.

Technical description

Power requirements

Table 5 lists the power requirements for the NT5K83 E&M Tie trunk card.

Table 9
NT5K83 Power requirements

Voltage	Active Current
+/- 15.0 V dc	150 ma
- 15 V dc	160 ma
+8.5 V dc	35 ma
+ 5 V dc	110 ma
-48 V dc	80 ma

Environmental specifications

Table 6 provides the environmental specifications for the NT5K83 E&M Tie trunk card.

Table 10
NT5K83 Environmental specifications

Parameter	Absolute Limit
Operating temperature	10 to 45 degrees C, ambient
Operating humidity	20 to 80% RH (non condensing)
Storage temperature	-20 to +60 degrees C

Transmission parameters

Loss values for the NT5K83 E&M trunk card are given in Table 7.

Table 11
NT5K83 4 Wire E&M trunk card

	ETSI	Existing
Loss A/D	0	0
Loss D/A	0	0

Recorded Announcement/Music

	ETSI	Existing
Loss A/D	0	4

Paging

	ETSI	Existing
Loss D/A	3	-3

Trunk types description

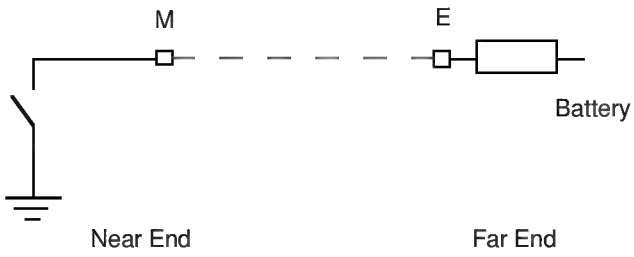
Each unit on the NT5K83 E&M Tie trunk card supports:

- 4-wire E&M trunk type 5 and 2
- Recorded Announcement (RAN) trunk
- Paging (PAG) trunk
- Music (MUS) trunk

4-wire E&M Type 5 trunk operation

Type 5 E&M operation uses two signaling leads, E and M, that are electrically separated from the associated speech circuit. Signals are sent on the M lead and received on the E lead as shown in Figure 1.

Figure 1
E&M Type 5 signaling



Send signals

All signals are sent in the form of a contact between M and ground or an open circuit between M and ground.

Receive signals

Signals are received on the E lead by detecting the conditions applied to the M lead by the far end.

Idle state

In the Idle state, the M lead receives an "Idle signal" from the Option 11 and is ready to receive calls.

Seize

To place an outgoing call, the Option 11 at the near end sends a seizing signal through the M lead to the far end. The incoming end recognizes the seize signal and prepares to receive digits.

Dialing

Digits are sent through the near end M lead in the form of 10 pps pulses of the open-circuit condition.

Answer

When the called party answers, the far end sends an "answer" signal through the M lead.

Call disconnect

Either party can disconnect the call by applying a clear signal to the M lead. The far end applies a "clear back" signal, while the near end applies a "clear forward" signal. The circuit remains busy until both clear forward and clear backward signals have been exchanged.

Table 8 provides a summary of NT5K83 DC-5 signaling states.

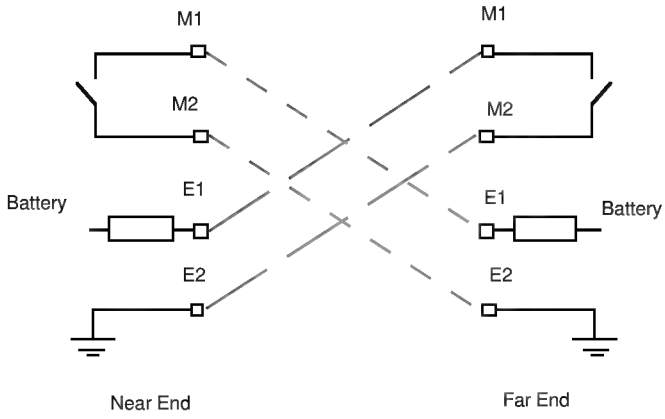
Table 12
Summary of NT5K83 DC-5 signaling states

Signal	Outgoing PBX sending condition — M Wire	Incoming PBX sending condition — M Wire
Idle	Open circuit	Open circuit
Seize	ground	—
Digit Pulse	Open circuit pulses in step with dial pulses	—
Answer	—	Ground
Clear forward	Open circuit longer than 300 ms	—
Clear back	—	Open circuit for longer than 300 ms

4-wire E&M Type 2 trunk operation

Type 2 E&M operation uses two signaling pairs, E and M, that are electrically separated from the associated speech circuit. Signals are sent on the M pair and received on the E pair as shown in Figure 2.

Figure 2
E&M Type 2 signaling



Send signals

All signals are sent in the form of a contact make or break between the two M leads. In the make state there is a maximum of 200 V$\sqrt{\Omega}$ between the two M leads. In the break state there is a minimum of 100 kΩ between the M leads.

Receive signals

Signals are received on the E lead by detecting the contact make or break applied at the far-end on the M leads.

Idle state

In the Idle state the Option 11 applies an "idle signal" to the M leads to indicate that it is available to receive calls.

Seize

To place an outgoing call, the Option 11 at the near end sends a seizing signal through the M leads to the far end. The incoming end (far end) recognizes the seize signal, busies the circuit against outgoing calls, and prepares to receive digits.

Dialing

Digits are sent through the near end M leads in the form of 10 pps pulses of the open-circuit condition.

Answer

When the called party answers, the far end sends an "answer" signal through the M leads.

Call disconnect

Either party can disconnect the call by applying a clear signal to the M leads. The far end applies a "clear back" signal, while the near end applies a "clear forward" signal. The circuit remains busy until both clear forward and clear backward signals have been exchanged.

Table 9 provides a summary of NT5K83 DC-5 Type 2 signaling states.

Table 13
Summary of NT5K83 Type 2 signaling states

Signal	Outgoing PBX sending condition — M Leads	Incoming PBX sending condition — M Leads
Idle	Contact break	Contact break
Seize	Contact make	—
Digit Pulse	Contact break pulses in step with dial pulses	—
Answer	—	Contact make
Clear forward	Contact break for longer than 300 ms	—
Clear back	—	Contact break for longer than 300 ms

Recorded Announcement/Music trunk operation

When used in the Recorded Announcement/Music mode, the trunk circuit is connected to a customer provided recorded announcement machine or a music source.

The NT5K83 E&M Tie trunk card supports the following types of announcement machines:

- Start mode announcement machines:
  (for example, Code-A-Phone and Viking DVA-1003A)
- Continuous mode announcement machines
  (for example, Audichron)

Start mode

In start mode, the E&M Tie trunk card provides a startpulse to the announcement machine to begin playback of the message. The announcement source requires the following:

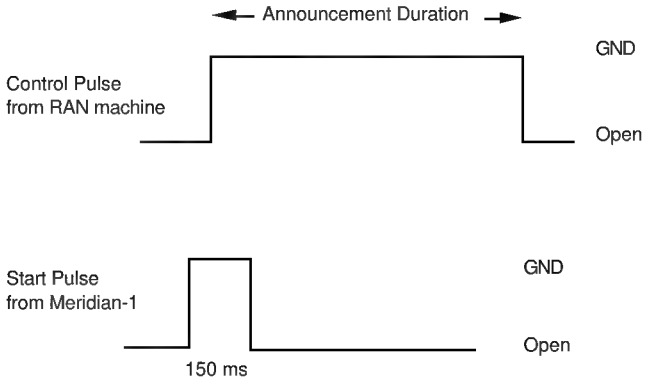
- an impedance of 4 ohms or less
- ground to the trunk unit when playing and an open circuit when idle. This is done through a control lead to the trunk circuit.
- default signal level of -9 dBm (in 600Ω) adjustable to a level of 10 dBm.

To start the announcement, the NT5K83 E&M Tie trunk card provides a momentary ground signal (150 ms) to the source. The announcement machine should then start playing its message.

The NT5K83 trunk card expects status information from the announcement machine, that is, whether it is idle or playing. For this reason, the announcement machine requires a control lead to the trunk circuit.

Figure 3 shows recorded announcement in start mode.

Figure 3
Recorded announcement - start mode



Continuous mode

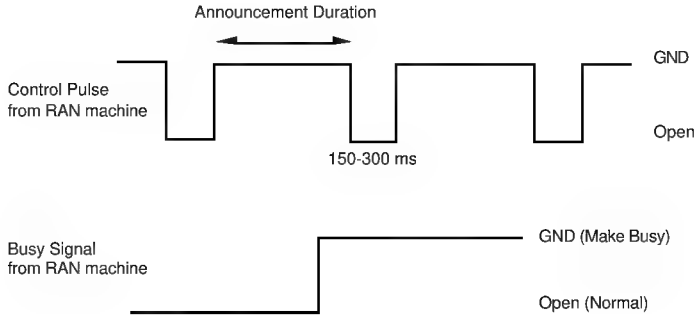
The requirements for continuous mode announcement machines are as follows:

- an impedance of 4 ohms or less
- generation of a control pulse (150 - 300 ms) at the start of the announcement period
- default signal level of -9 dBm (in 600Ω) adjustable to a level of 10 dBm.

The announcement machine may provide a separate busy signal when the machine is recording or erasing a message or if the machine is malfunctioning. The busy signal will be used by the Option 11 for maintenance purposes.

Figure 4 shows recorded announcement in continuous mode.

Figure 4
Recorded announcement - continuous mode



Music source

The music source should provide an impedance of 600 Ω. The default signaling level should be -9 dBm (in 600Ω) adjustable to a level of 10 dBm.

Paging trunk operation

When used in the paging mode, the trunk circuit is connected to a customer-provided paging amplifier system. When accessed, the card provides a loop closure. In a typical application, the loop closure will cut off a music supply and switch the paging trunk transmission path to the paging amplifier.

Flexible analog line circuit card

Functional description

The Flexible analog line card provides an interface for up to 16 analog (500/2500-type) telephones lines. It can be installed in slots 1-10 in the main cabinet and in any slot in the expansion cabinet.

There are two types of Flexible Analog Line Cards for use in Denmark:

- the NT5K02JB line card with message waiting
- the NT5K96JB line card without message waiting.

Common features

Both Flexible Analog line cards provide the following features:

- analog to digital and digital to analog conversion for 16 analog telephone lines
- software selectable A-Law or μ-Law companding
- hookswitch flash detection
- ground button detection
- variable loop current to allow automatic gain compensation according to loop length
- card-identification for auto configuration
- additionally, the NT5K02 circuit card provides a flashing low voltage 1 Hz message waiting signal.

Physical description

Switch settings

There are no option switches on the Flexible Analog line card. All settings are configured in software.

Connections

The Flexible Analog line card has 16 units. Each unit connects to the shelf backplane through an 80-pin connector. The backplane is cabled to the input/output (I/O) panel which is then cabled to the cross-connect terminal. At the cross-connect terminal, each unit connects to external apparatus by tip and ring leads.

Faceplate LED

The faceplate of the NT5K02 is equipped with a red LED which lights when all the assigned units on the circuit card are disabled.

Technical description

Power requirements

Table 1 lists the power requirements for the NT5K02 Flexible Analog line card.

Table 14
NT5K02 & 96 Flexible Analog line card power requirements

Voltage	Idle current	Active current
+15.0 V dc	120 ma	120 ma
-15.0 V dc	24 ma	24 ma
+ 8.5 V dc	250 ma	280 ma
-48.0 V	0 ma	320 ma
- 48.0 V dc	60 ma	700 ma
Ring V ac	0 ma	160 ma (Note)

Note: Reflects 10 ma for ringing one telephone per unit. There may be more than one telephone or ringer on a unit.

Environmental specifications

Table 2 lists the environmental specifications of the Flexible Analog line card.

Table 15
NT5K02 & 96 Flexible Analog line card environmental specifications

Parameter	Specifications
Operating temperature	0 to 45 degrees C, ambient
Operating humidity	5 to 95 % Relative Humidity
Storage temperature	- 40 to + 70 degrees C

Transmission parameters

Loss values for the NT5K02 & 96 are given in Table 3.

Table 16
NT5K02 & 96 Analog line card

	ETSI	Existing
Loss A/D	0	4
Loss D/A	6	1

Signalling

Loop operation

The Flexible Analog Line Card is loop start, with a loop limit of 1800 Ω including the telephone set.

Table 4 lists the number of telephone sets that can be supported by the loop.

Table 17
Loop limits

Loop resistance including telephone sets	Number of telephone sets
350 Ω or less	2
Over 350 Ω to a maximum of 1800 Ω	1

Ringers

The Flexible Analog Line Card supports any number of ringers up to a maximum ac impedance presented to the line of 3.5 KΩ. Typically, a maximum of two NE-C4A-type ringers can be supported.

Message waiting indicator

The message waiting indicator consists of a LED flashing at a rate of 1 Hz at the telephone set. (A continuously lit LED as a message indicator is not provided.) The LED is activated as a result of a reversal of the Tip and Ring leads.

Ground button detection

The ground button detector sends a recall signal 30 to 50 ms after the application of a ground on either the Tip or Ring of the line. The ground must be applied for a time greater than the minimum hookflash time. The loop resistance to the ground signal can be between 0 and 500 Ω.

Tone detector circuit card

Functional description

The NT5K48 Tone Detector circuit card provides tone detection for either Dual Tone Multifrequency (DTMF) or Dial Tone (DT) detection. It can be installed in slots 1 through 10 in the main cabinet, but is normally installed in slot 9.

Common features

The NT5K48 Tone Detector circuit card:

- provides eight channels of tone detection configurable on a call-connection basis for either DTMF or DT detection
- is configurable on a call connection basis to provide both first stage Dial Tone Detection (DTD) and second stage DTD

Note: The NT5K48 Tone Detector remains dedicated to the call while the connecting process is progressing. Once the call is connected, the NT5K48 Tone Detector is released: it will not detect dial tone after the call is established.

- supports both A-Law and μ-Law companding
- provides card-identification for auto configuration, and for determining the serial number and firmware level of the card
- provides for hardware self test
- allows country specific DTMF and dial tone characteristics to be downloaded from software.

Physical description

Switch settings

There are no option switches on the NT5K48 Tone Detector circuit card. All settings are configured in software.

Self-test

When the NT5K48 Tone Detector circuit card is installed and power is applied to it, a self-test is performed on the card. The red LED on the NT5K48 faceplate flashes three times, then remains continuously lit until the card is enabled in software. If the self-test fails, the LED will remain lit after the card is enabled.

Technical description

Power requirements

The NT5K48 Tone Detector has a maximum current draw of 1.5 amps at 5V.

Environmental specifications

Table 1 lists the environmental specifications of the NT5K48 Tone Detector circuit card .

Table 18
NT5K48 circuit card environmental specifications

Parameter	Specifications
Operating temperature	0 to 45 degrees C, ambient
Operating humidity	5 to 95 % Relative Humidity
Storage temperature	- 40 to + 70 degrees C

Dial tone detection

The NT5K48 Tone Detector circuit card is designed for use in Denmark

First stage dial tone detection

The following dial tone characteristics are supported by the NT5K48 Tone Detector circuit card used in Denmark.

- First stage dial tone frequency detection band (DFQ)
  - Band A (DFQ 1)350 Hz through 500 Hz
- Minimum Detect Level (MDL)
  - -10 dBmO through -40 dBmO in decrements of 2 dB
- Minimum Validation Time (MVT)
  - durations of 100 mS through 1600 mS in increments of 100 mS
- Break duration of continuous tone not cadenced (BRK)
  - 0 mS through 240 mS in increments of 16 mS
- Cadence type (CAD)
  - 0 (continuous tone)

Second stage dial tone detection

Second stage dial tone detection allows the NT5K48 Tone Detector to interrupt digit outpulsing until a second dial tone is detected. The characteristics of the tone detected are as defined for the first stage dial tone.

Note: Second stage dial tone is not usually used in Denmark.

Country specific tone detection

The NT5K48 Tone Detector is designed for use in Denmark. It can be set to the characteristics of country specific tones by using overlay 97.

The XTD (NT5K48AA) pack is backward compatible from 8B software to 7C software . It is not however backward compatible to 7B software , a specific XTD pack is required for 7B software (NT5K48DA pack) .

The minimum accepted level for the XTD is -30dBm and the maximum reject level is -40dBm for Dial Tone . The present minimum detect level (MDL)used in overlay 97 is -32dBmO .

For ETSI Mode , the XFCOT will decrease the level of the dial tone by 4dB . The new minimum detect level (MDL in overlay 97) needed to meet ETSI requirements should be -34dBmO .

Denmark

Typical settings for Denmark are as follows:

Characteristic	Mnemonic	Setting
Frequency Band	DFQ	1
Minimum Detect Level	MDL	-34 dBm0
Minimum Validation Time	MVT	1500 mS
Break Tolerance	BRK	000 mS
Cadence Type	CAD	00
Second Stage Configuration	SSC	See Note
Minimum Acceptance Level	MINL	-45 dBm

Note: Second Stage Configuration allows the definition of second stage dial tone. Second stage dial tone detection is not normally required for in Denmark.

Refer to the Option 11 *Software guide* for more detailed information about use of overlay programs.

Terminal Information

M2250/M2616 General Information

The M2250 console and M2616 Aries meet the requirements of both the 'Digital' and 'Analog' Interface operation using transmission parameters in Overlay 17 .

For EXISTING and ETSI Operation the following transmission parameters are to be downloaded:

- CODE = 2 (A-law)
- TOLR = 47
- ROLR = 9
- SOLR = 0
- HTLR = 48
- HRLR = 8
- AGCD = YES
- VOLR = YES

Meridian 1

Intelligent peripheral equipment circuit cards for Denmark

Option 11 - Description and Installation

© 1992,1994 Northern Telecom
All rights reserved
Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant. This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules.
SL-1 and Meridian 1 are trademarks of Northern Telecom.
Publication number: Supplement to 553-3011-210
Document release: Provisional 2.0
Date: April 1994
Printed in Canada